

Case (3) Earthquake-resistant renovation (Kikai-Shinko-Kaikan Building)

- Forty years old office building has been renovated for both energy saving and earthquake resistance. The building became more competitive from the functional and environmental points of view.
- The renovation improved the building based on the reduction of carbon dioxide emission and life cycle cost.
- The renovation is carried out while tenants are remaining inside. This is possible because of flexible process management. So the additional work and cost for temporal move because of renovation could be avoided.

Name: Kikai-Shinko-Kaikan Building
Location: Minato Ward, Tokyo City
Contractor: Japan Society for the Promotion of Machine Industry
Builder: Shimizu Corporation



Exterior of the building

Source CSR Report of Shimizu Corporation

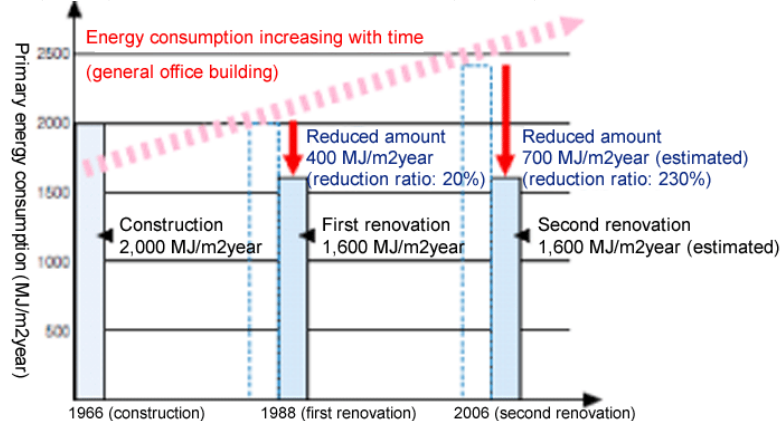
[Efforts for improving the environmental performance]

Promoting the measures for energy saving of existing building stocks that account for more than 95 percents of all buildings for business is very important for realizing low carbon society. The case of Kikai-Shinko-Kaikan Building (builder: Shimizu Corporation) is renewal of an office building that is about forty years old to the latest energy-saving one. This building was constructed in 1966 and renovated every twenty years. In the second renovation in 2006, the theme was the "green office." The target was to improve its competitiveness as a tenant building from both environmental and functional view points lowered by aging, and make it an attractive building that can be utilized safely and comfortably over a long period of time. When starting the renovation, the building was evaluated comprehensively using Shimizu's original standards "Revised Shimizu Green Code" to understand the current status of the building. Then constructions for rebuilding and renovation were compared from the life cycle cost point of view. Renovation was selected because it was more economic and the floor area ratio could be kept the same. The followings are five key points of renovation:

- ① Safety: reinforcement for earthquake resistance, measures for avoiding scattering of glass
- ② Energy saving: improvement of efficiency of facilities (air conditioning, lighting), employment of water-saving toilets
- ③ Longevity: greening of roofs (water-proof), set up of prefabricated toilets
- ④ Functional improvement: individual air conditioning, renovation of toilets, renovation of approaches
- ⑤ Maintenance: introduction of BEMS (Building and Energy Management System), coating window glasses with photocatalyst

Energy consumption of a general office building of about the same size as this one and constructed ca. forty years ago is ca. 2,300 MJ/m²year. The energy consumption of the Kikai-Shinko-Kaikan Building after the second renovation that has introduced energy saving technologies is ca. 1,600 MJ/m²year showing a remarkable energy reduction. So the energy saving renovation can reduce the annual energy consumption by ca. thirty percents when compared with an average office building of the same size. The increase of energy due to aging could be prevented. When compared with rebuilding, the renovation of this building could reduce the carbon oxide emission by ca. 16,000 t.

The independent evaluation using CASBEE showed that the BEE value indicating the environmental efficiency was equal to 0.6 (rank B) before renovation, but rose to 1.0 (rank B+) after the second renovation.



Shift and estimation of the energy consumption

Source CSR Report of Shimizu Corporation

[Relation with stakeholders]

(1) Owner of the building

Renovation could improve the competitiveness as a tenant building from both environmental and functional view points lowered by aging. When compared with rebuilding, renovation could suppress the life cycle cost and carbon dioxide emission. The floor area ratio could be kept the same.

(2) Tenant

Tenants can enjoy reduction of running costs and a comfortable working environment based on renewal to latest energy saving facilities. In many cases of large renovations, tenants must move temporarily. In this case, renovation is carried out while tenants are remaining inside. This is possible because of flexible process management. So the additional work and cost for temporal move because of renovation could be avoided.